



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/832,378	04/11/2001	Ian William Carpenter	JMYT-224US1	2241
23122	7590	02/17/2004	EXAMINER	
RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980			WILLS, MONIQUE M	
			ART UNIT	PAPER NUMBER
			1746	

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/832,378

Applicant(s)

CARPENTER ET AL.

Examiner

Wills M Monique

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Art Unit: 1746

DETAILED ACTION

Priority

The United Kingdom foreign priority document(s) 9806199.7, filed March 24, 1998 and submitted under 35 U.S.C. 119(a)-(d), has NOT been received.

Information Disclosure Statement

The information disclosure statement filed August 2, 2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. More specifically, the British Search Report dated June 12, 1998, International Search Report dated June 16, 1999 and "The Hot SpotTM Reactor" by Jenkins and Shutt have not been considered.

Claim Objections

Claim 16 is objected to because of the following informalities: the terms "oxidizable" and "oxidized" are misspelled. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 provides for the use of a hydrogen generation process in a fuel cell, but since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced. In the present case, the claim does not set forth any method/process steps delimiting how the hydrogen generation is used in the fuel cell.

Claim 22 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd. App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966). As previously stated, the claim does not set forth any method/process steps delimiting how the hydrogen generation is used in the fuel cell. Additionally, use claims are not a statutory class of invention.

Claims 19-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 19, the term "carbon monoxide in the hydrogen produced from the hydrogen" is of uncertain meaning, rendering the claim vague and indefinite. The Examiner assumes that the term should read, "reduction of carbon monoxide in the hydrogen produced from the hydrogen generation reaction". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12 & 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobs et al. U.S. Patent 5,510, 056 in view of Rudy, U.S. Patent 5,531,972.

Jacobs teaches a process for the catalytic partial oxidation of a hydrocarbon feedstock comprising: contacting a hydrocarbon feedstock and an oxygen-containing gas with a catalyst (abstract). The hydrocarbon feedstock contains hydrocarbons having 1 to 5 carbon atoms, such as methane (col. 4, lines 20-30). The feedstock is

Art Unit: 1746

mixed with an oxygen –containing gas, such as air, and optionally steam (col. 4, lines 35-50). The mixture is preheated prior to being contacted with the catalyst (col. 5, lines 10-15). The catalytically active material includes rhodium on a zirconia refractory oxide support (col. lines 40-45). Mixed refractory oxides, those that contain at least two cations, may also be employed as the carrier material for the catalyst. Rhodium may be present from 0.5 to 5% by weight of the supported catalyst (col. 8, lines 25-40).

The reference does not teach a the catalyst support including ceria, a weight ratio of ceria to zirconia from 0.5 to 99.5 to 99.5 to 0.5 or a weight ratio of ceria to zirconia from 5 to 95 to 95 to 5.

Rudy teaches that it is conventional to employ rhodium on ceria-impregnated zirconia to enhance the efficacy of the catalytic support. When ceria is employed, it promotes both a water gas shift reaction, thereby promoting the oxidation of CO to carbon dioxide, as well as a steam reforming reaction, thereby promoting the reaction of saturated hydrocarbons and water to produce hydrogen. The amount of ceria impregnated into zirconia is limited to 10 percent by weight, based on the total weight of the support. Stated differently, a weight ratio of ceria to zirconia is from 10 to 90. Limiting the amount of ceria stabilizes the catalyst by precluding or reducing sintering of rhodium. See column 6, lines 35-55.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to employ ceria in the zirconia support of Jacobs, because Rudy teaches that ceria enhances the efficacy of the catalytic support. More specifically, ceria promotes both a water gas shift reaction, thereby promoting the

Art Unit: 1746

oxidation of CO to carbon dioxide, as well as a steam reforming reaction, thereby promoting the reaction of saturated hydrocarbons and water to produce hydrogen.

As to the weight ratio of ceria to zirconia, it would have been obvious to employ ceria in an amount encompassed by the instant claims, because Jacobs teaches that ceria should be limited to 10% of the support in order to stabilize the catalyst.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-7, 13 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kleefisch et al. U.S. Patent 5,980,840 in view of Rudy U.S. Patent 5,531,972.

Kleefisch teaches a process for the catalytic generation of hydrogen comprising contacting a mixture of hydrocarbon gas, oxygen and steam (col. 15, lines 60-68 and col. 16, lines 10-20) with steam reforming and oxidation catalysts (col. 16, lines 40-50). The hydrocarbons from which synthesis gas is made includes straight chained methane, ethane and other light hydrocarbon gases (col. 14, lines 65-68). The oxygen containing gas can be air, pure oxygen or any other gas containing at least about 1

Art Unit: 1746

mole percent free oxygen (col. 13, lines 55-60). It is desirable to maintain the catalyst bed at relatively high temperatures within the operation range, since the efficiency of the entire reaction system improves with higher partial oxidation and steam reforming temperatures (col. 17, lines 5-10). Therefore, the reference suggests pre-heating the catalysts to temperatures at which partial oxidation of the hydrocarbon commences. Suitable catalysts can include commercial catalyst for steam reforming of methane and other hydrocarbons (col. 19, lines 10-15).

The reference is silent to contacting the gas mixture with a catalyst including rhodium on a ceria-zirconia refractory support.

Rudy teaches that it is conventional to employ a rhodium catalytic component on zirconia/dispersed ceria support, to enhance the efficiency of the consumption of both hydrocarbons and carbon monoxide in the gaseous stream being treated (col. 6, lines 55-63), thereby, increasing the amount of hydrogen generated by the catalytic reaction.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the catalyst of Rudy in the hydrogen generation process of Kleefisch, because the secondary reference teaches that Rh-ZrO₂/CeO₂ catalysts enhances the consumption of hydrocarbons and carbon monoxide, thereby increasing the amount of hydrogen generation.

Claim R jections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13 & 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobs et al. U.S. Patent 5,510, 056 in view of Rudy, U.S. Patent 5,531,972, as applied to claim 1 above, and further in view of Jenkins U.S. Patent 4,897,253.

Jacobs in view of Rudy substantially teaches the invention necessitated by claim 1, as described hereinabove.

Jacobs, however, is also silent to pre-heating the catalyst to a temperature at which self-sustaining partial oxidization of the hydrocarbon commences. The reference is also silent to pre-heating by feeding the catalyst an oxygen-containing gas and initiation compound, wherein the initiation compound is selected from methanol or hydrogen.

Jenkins teaches that it is conventional to pre-heat catalysts to a temperature at which partial oxidation of the hydrocarbon begins (col 3, lines 50-60, col. 4, lines 1-5). This is achieved by injecting air and methanol or hydrogen in the catalytic reactor (col. 3, lines 15-55). Pre-heating reduces the light-off temperature of the catalyst, thereby obviating the need of external heat for the process to proceed (col. 7, lines 15-40).

Art Unit: 1746

Jacobs and Jenkins are properly combinable, because they are from the same field of endeavor, namely, the catalytic generation of hydrogen from hydrocarbons.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the pre-heating process of Jenkins in the hydrogen generation method of Jacobs, in order to reduce the light-off temperature of the catalyst, thereby obviating the need of external heat for the process to proceed.

Conclusions


Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Randy Gulakowski, may be reached at 571-272-1302.

The Official fax number is 703-872-9306.

Mw

01/20/04


BRUCE F. BELL
PRIMARY EXAMINER
GROUP 1746